

THE EFFECT OF AN INTRODUCED NITROGEN-FIXER  
(MYRICA FAYA) ON PRIMARY SUCCESSION  
ON VOLCANIC CINDER\*

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Myrica faya, an alien nitrogen-fixing shrub, is invading recent volcanic cinder deposits on the island of Hawai'i. No native symbiotic nitrogen-fixers are present in this habitat, and native vegetation is low in nitrogen. Nitrogen availability in successional soils increases slowly to less than 100 milligrams of nitrogen per square meter per month in 200-year-old stands. Natural sources of nitrogen in the area include rainfall and nonsymbiotic fixation from some lichens, bryophyte mats, and decaying wood. Myrica nodules reduce acetylene in early successional stands at a rate of 4-10 micromoles per gram per hour. Native Metrosideros polymorpha saplings responded to nitrogen fertilization with a 2.5-fold increase in extension growth. If nitrogen added by Myrica has an effect similar to nitrogen fertilization, Myrica may alter growth rates of associated native and alien species.

Myrica individuals frequently establish under existing Metrosideros trees. Myrica seed rain was found exclusively under Metrosideros canopies, and no seeds were found in the open, strongly supporting the hypothesis of bird dispersal. However, greenhouse experiments showed Metrosideros litter reduced Myrica germination by 50 percent. Therefore, Metrosideros may enhance dispersal of Myrica seeds but inhibit Myrica establishment.

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\*ABSTRACT